

REMARKS

Claims 1, 2 and 4-6 are currently pending. In the Office Action, claims 1, 2 and 4-6 were rejected under 35 U.S.C. 103(a) as being unpatentable over Fuderer (US 4,650,651). In view of the foregoing amendments and the following remarks, Applicants request reconsideration and allowance of the claims.

Fuderer is directed to an integrated apparatus for the primary and secondary catalytic steam reforming of hydrocarbons. In the Fuderer apparatus, the primary and secondary reformer zones are contained within a single vessel. The partly reformed effluent from the primary reformer zone of the apparatus passes, in a suitable conduit, through the catalyst bed to the space at the feed end of the secondary reformer zone into which preheated oxygen-containing gas is being introduced. The hot secondary reformer effluent does not leave the apparatus, but passes on the shell side of the primary reformer zone, thereby applying the heat required for the endothermic primary reforming reaction that occurs within the catalyst-containing reactor tubes of said primary reformer zone.

The present invention, on the other hand, comprises two reaction vessels. Partial oxidation of the carbonaceous feedstock occurs in an upper end of the first reactor vessel and then, after mixing with the gaseous product of the steam reformer, passes through a bed of reforming catalyst positioned in the lower end of the partial oxidation reactor vessel. The gaseous mixture exiting from the partial oxidation reactor vessel after passing through the catalyst is fed to a second vessel to provide heat for the convective steam reforming reaction zone that is contained within the second vessel.

The arrangement of the present invention permits use of the catalytically steam reformed carbonaceous feedstock to cool the partially oxidized carbonaceous feedstock in the lower end of the first vessel before passing through the bed of reforming catalyst positioned in the lower end of the partial oxidation reactor vessel. Applicants respectfully submit that this arrangement is neither taught nor suggested by the Fuderer reference.

In Fuderer, the partly reformed effluent from the primary reformer passes to the secondary reforming zone through a conduit extending through the center of the secondary reforming catalyst bed to the reaction space above the catalyst bed. This configuration can cause

uneven temperature gradients within the secondary reforming catalyst bed. The arrangement of the present invention avoids this disadvantage.

In view of the foregoing, Applicants submit that claim 1 would not have been obvious in view of the Fuderer reference. Inasmuch as the remaining claims all depend from claim 1, Applicants submit that they would not have been obvious for the same reasons.

Should the Examiner find any impediment to the prompt allowance of the case that could be corrected by telephone interview with the undersigned, the Examiner is requested to initiate such an interview.

Respectfully submitted,

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